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TRENDS IN CD4 COUNT RECOVERY AND CLINICAL CHARACTERISTICS OF HIV-INFECTED PATIENTS INITIATING ANTIRETROVIRAL THERAPY IN DARBHANGA MEDICAL COLLEGE, DARBHANGA , BIHAR

Microbiology

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ABSTRACT

HIV is isolated in 1983, human immunodeficiency Virus (HIV), the agent that causes acquired immune deficiency syndrome (AIDS), is classified as members of the lentivirus subfamily of retroviruses. Although HAART is known to profoundly suppress viral replication, it increases CD4 cell count and delays disease progression and death; patients on Highly Active Antiretroviral Therapy (HAART) commonly suffer from side effects of the drug. Each antiretroviral drug is associated with specific adverse effects.

Objective: The aim of this retrospective cohort study was to describe immunological response among HIV-infected individuals receiving highly active antiretroviral therapy(HAART) with long-term follow-up.

Method: A Cohort retrospective study design was conducted to assess immunological (the CD4+ recovery) among HIV-infected individuals receiving highly active antiretroviral therapy (HAART) with long-term follow-up. ART-naive patients with symptomatic HIV disease at baseline (before ART) and after 6 and 9 and 12 months of ART was collected from records.

Result: A total of 887 HIV positive patients involved in this research; Out of these 472(53.2%) were female and 415 (46.8%) male patients. None of them have any opportunistic infection during the time of follow up. The mean age of the study group was 36.76 (17-76). The mean baseline CD4+ count was 81.40; the mean CD4 count at the 6th, 9th and 12th month was 191.65, 284 and 331 respectively. **Conclusion:** In this study, although good CD4 cells recovery in response to ART wasdocumented in more than 81% of follow-up cases, HIV-positive patients were enrolled in ART program at decreased CD4 cells levels

KEYWORDS

Immunological response, CD4count, HAART.

INTRODUCTION:

The human immunodeficiency virus (HIV) is a retrovirus refers to the virus directed synthesis of DNA from an RNA template and is converted in to DNA which is integrated in to host chromatin and transcribed as cellular gene(1).The immune systems, different cells work together to protect the body against pathogens such as viruses and bacteria. The human immunodeficiency virus (HIV) mainly infects the CD4 T cells in the immune system (2).CD4 is a protein found on the surface of different cell type including a subclass of lymphocyte called T-helper cell, and monocytes. CD4 binds to the GP-120 molecules which are expressed on the outside membrane of HIV. The viral RNA reverse transcribed to DNA using the viral enzyme reverse transcriptase then with the help of integrase, the proviral DNA integrates with the host genome. When host cell gets activated virus replicates using the host machinery, As HIV disease progress, the number of CD4 T cell progressively declines (3) the absolute CD4 count is calculated from the CD4 cell percentage and the total white blood cell count. The mean normal value for most laboratories is approximately 500-1,300 cells/µL. It is used to stage the patient's disease, determine the risk of opportunistic illnesses, assess prognosis, and guide decisions about when to start antiretroviral therapy (ART) and when to stop prophylaxis against opportunistic infections with patients whose CD4 T cell counts rise in response to ART (4).

Therefore, our study deals on the study of immunological recovery as measured by CD4 counts, and clinical characteristics, by using patients who have CD4 cell results before and after initiation of ART using as a base line less than 200cells/µl and also by including those patients who starts ART in CD4 cells above 200cells/µl. and compared immunological recovery of these patients[5]

AIMS AND OBJECTIVES:

To assess the immune recovery of HIV infected patients before and after the initiation of ART as measured by CD4 counts and clinical characteristics of HIV infected patients accessing ART

MATERIALS AND METHODS:

The study was a retrospective study which assessed the change in level of CD4+ cell count before and after starting ART and clinical characteristics of HIV infected patients . HIV positive individual who were visiting ART Centre Darbhanga Medical College and Hospital, DarbhangaART clinic starting from 2016 to 2020.

Data collection

Data was extracted from record book and the patient card including Age, sex, CD4 count result with date and clinical characteristics. When whole blood is added to the BD Facs count reagent ,the fluorochrome –labelled antibodies in the reagent bind specifically to leukocyte surface antigen .During acquisition ,the cells travel past the laser beam and scatter the laser light .The stained cells fluoresce .These scatter and fluorescence signals are detected by the instrument providing information about cell's size ,internal complexity, and relative fluorescence intensity .Tri-TEST reagents employ fluorescence triggering ,allowing direct gating of the lymphocyte population to reduce contamination of unlysed or nucleated red blood cells in the gate.

Data Analysis

Data were entered and analyzed with SPSS version16). Chi-square test and other relevant statistical methods were used to see the association of the variables and the presence of significant difference between values. P values <0.05 were considered as statistically significant.

Ethical clearance or consideration

This study was approved by the ethical and research committees of Darbhanga Medical college and Hospital, Darbhanga. Confidentiality was maintained throughout the study.

RESULT:

A total of 1100 adult HIV/AIDS patients were newly enrolled to HIV from the 1st of January 2016 and 30th of December 2020 but 212 patients were excluded due to missing charts or incomplete baseline and follow up data. Therefore, a total of 888 adult HIV/AIDS patients record were analyzed. Of the 888 adult HIV/AIDS patients who met the inclusion criteria for the study the majority (63.9%) were females. The median age of patients at ART start was 35 years (Inter Quartile Range (IQR) = 29-41years) and more than half of the patients were married (57.9%) this is similar with a study conducted in Tanzania married individual form a large group (22). One hundred seventeen (13.2%) of the study participants had no formal education. (Table1).

Table 1: socio demographic characteristics of HIV infected patients initiating ART in Darbhanga Medical College and Hospital , Darbhanga 2016-2020.

Variables		Number	Percentage
Sex	Male	320	36.1
	Female	568	63.9
Age(median, IQR)	35 years (IQR 29-41)		
Marital status	Single	195	22
	Married	514	57.9
	Divorced	82	9.2
	Widow/widower	73	8.2
	Separated	24	2.7
Educational level	Illiterate	117	13.2
	Primary	286	32.2
	Secondary	329	37
	Tertiary	156	17.6

Table 2: Baseline CD4+ cell count among ART naive HIV patients in different age Categories.

Age	Base line CD4 count						
	<50	50-99	100-149	150-199	200-249	>= 250	Total
	n(%)	n (%)	n(%)	n(%)	n(%)	n(%)	n(%)
<20	2(3.4)	2(1.8)	1(0.4)	9(4.3)	0(0)	1(0.5)	15(1.2)
20-29	14(23.7 %)	26(23.6%)	54(23.3)	43(20.6)	17(27.4)	59(27.3)	213(24)
30-39	24(40.7)	50(45.5)	98(42.2)	94(45)	25(40.3)	76(35.2)	367(41.3)
40-49	15(25.4)	29(26.4)	56(24.1)	44(21.1)	16(25.8)	60(27.8)	220(24.8)
50-59	3(5.1)	2(1.8)	16(6.9)	12(5.7)	4(6.5)	20(9.3)	57(6.4)
>= 60	1(1.7)	1(0.9)	7(3.02)	7(3.3)	0(0)	0(0)	16(1.8)
Total	59	110	232	209	62	216	888

DISCUSSION:

In this study, the majority of patients initiating ART were female. A similar finding was reported by sub-Saharan Africa, Latin America, and Asia (8) and by Braitsein*et al*; (10) from South Africa who stated ART in low-income countries were more likely to be females. This is because females are biologically and socially more vulnerable to HIV infection in the developing countries (3). Most of the HIV infected patients enrolled in my study were young age between 30 and 39 years old who were sexually more active and thus have a higher risk of infection compared to the other age groups (13). These findings could conform as previous reports from elsewhere in Ethiopia (6). At baseline, the median CD4 cell count of HIV infected patients was lower 160 cells/µl this could be due to delayed presentation and/or testing, differences in educational and socio-economic levels. Moreover, Tsegaye*et al*; (3) reported that healthy HIVnegative Ethiopians had lower mean CD4 cell counts (775/µl) than other Africans and individuals from Western countries. In My study, female HIV patients had higher median CD4 cell counts than male ($p < 0.001$) before ART was initiated . This is consistent with a study conducted in in the Kagera Region in Tanzania (2) and with Kumarasamy*et al*; (4) report from India and also in zewditu Hospital in Addis Ababa Ethiopia(5). This difference could be due to several Bibliography on HIV/AIDS in Ethiopia and Ethiopians in the Diaspora: The 2009 Update reasons; it may be due to a sex-related difference in the overall CD4 counts among males and females as reported by Tsegay*et al*; (3). HIV sero-negative Ethiopian females had relatively higher CD4 cell counts than HIV sero negative males .Regarding who clinical stage the majority 465(52.4%) started treatment in stages of the disease (stage 3 and stage 4) this is similar with a study conducted in south Africa (9). In my research I also found that After 24 months of ART initiation WHO stage III/IV declined significantly to 155 (17.5%) and 68(7.7%) respectively ($p<0.001$)(table 2). And older age were associated with decreased risk of advanced disease at the time of accessing ART . And also OIS 225(25%) had pre therapy OIS and it significantly declined to 144(16.2%) after 24 months of ART therapy ($p<0.001$) (table 2). Among other infection other than OIS 158(18%) before ART initiation but it declined to 152(17%) after 24 months of ART initiation so this research showed that ART initiations important for decreasing WHO stage, OIS and other infection (table.2). The ART service for HIV-infected patients in Ethiopia is improving in effectiveness. First, we documented that the median CD4 count at the time of ART initiation has increased substantially from 160cells/mm3 to 396 cells/ mm3 at 24 months after ART initiation. Second, we found improvements in the pharmaco-epidemiology of the roll out over time with reductions in more toxic regimens: the use of D4T in the first regimen fell and the fraction of patients starting NVP-based regimens decreased as more regimens made use of EFV instead.[10]

CONCLUSION:

ART has considerably improved the immune recovery and decreased WHO stage, opportunistic infection and also other infection other than opportunistic infection. We strongly recommend underline the need of anti-retroviral therapy in HIV infected patients for immune reconstitution. Although a good CD4 cells recovery and decreased WHO stage, OIS and other infection other than OIS in response to ART was documented during 24 months of follow up cases, HIV-positive patients were enrolled in ART program at decreased CD4 cells levels. Therefore, interventions need to be designed to promote early HIV testing and early enrollment of HIV infected individuals into ART services.I found improvements in the pharmaco-epidemiology of the roll out over time with reductions in more toxic regimens: the use of D4T in the first regimen fell and the fraction of patients starting NVP-based regimens decreased as more regimens madeuse of EFV instead.

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